The Continued Use of PCB-Affected Concrete Through Implementation of the 761.30(p) Use Authorization

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By

Richard A. Scadden, P.E.
Intera, Inc.
Austin, Texas

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Background

- PCBs are regulated by TSCA in 40 CFR 761.
- Most uses of PCBs are prohibited by 761.20.
- Several uses of PCBs are authorized by 761.30.
- 1998 PCB Disposal Amendments added a new 761.30(p), authorizing the “Continued use of porous surfaces contaminated with PCBs regulated for disposal by spills of liquid PCBs”.
- 761.30(p) allows in-place management and provides a temporary alternative to the immediate removal of PCB-affected concrete.

Continued Use Provision Contested Wording

- Any person may use porous surfaces contaminated by spills of liquid PCBs at concentrations > 10 µg/100 cm^2 for the remainder of the useful life of the surfaces and subsurface material if……(1998)(after 2001)
- Any person may use porous surfaces contaminated by spills of liquid PCBs at concentrations ≥ 50 ppm for the remainder of the useful life of the surfaces and subsurface material if……(2001)

Applicability of Continued Use Provisions

- Source concentration ≥ 50 ppm
- Release greater than 72 hours old
- Surface concentration of PCBs greater than 10 micrograms/100 sq. cm.

761.30(p) Requirements

- Remove/contain the source of the PCB release.
- Identify PCB-affected porous surface areas.
- Perform Subpart S double wash rinse procedure.
- Apply two layers of epoxy encapsulant or a solid surface to cover the affected area.
- Mark the affected area with the PCB M_L label.
- Maintain encapsulant and marking in good condition.
- Dispose of the concrete at end of its useful life.

Case Study

- In 1999, 761.30(p) authorization was applied to 7,000 SF of PCB-affected concrete in an electric utility's transformer shop and PCB storage building.
  - Method
  - Results
  - Schedule
  - Cost
  - Lessons learned
  - Limitations
  - Alternatives
  - Conclusions

Characterization Sampling

- Historical transformer oil spills suspected, locations identified.
- Concrete bulk & wipe sampling performed according to Subpart N.
- Several concrete cores collected to evaluate depth of PCBs.
- Samples were analyzed for PCBs using Method 8082.
- 7,000 SF of PCB-affected concrete (>10 ug/100 cm^2 or > 50 mg/kg) were delineated.

Alternatives

- 761.30(p) continued use
- Concrete removal and disposal according to 761.61(a)
  - Jackhammering
  - Shotblasting
  - Scarifying/Scabbling
  - Hydroblasting
  - Saw Cutting
- Risk based closure according to 761.61(c)
- Alternative decontamination (e.g., chemical extraction) according to 761.79(h)
- Utility decided to implement 761.30(p) because of desire to minimize disturbance

Source Removal

- 40 CFR 761.30(p)(1)(i) requires removal or containment of the PCB source to prevent further release to the surface.
- No observed release, but spills from transformers likely historical source.
- Existing equipment in the transformer shop was relocated.

Detergent Wash

- 761.30(p)(1)(ii) requires the surface to be cleaned using the Subpart S double-wash-rinse procedure.
- Select solvent or detergent wash as the first step.
- Each square foot of surface was scrubbed with a ZEP *Z-Green* industrial detergent solution for 1 minute.
- Solution was mopped up and the floor was vacuumed.
- Wastes contained for disposal.

Potable Water Rinse

- Water rinse followed wash.
- Each square foot of floor was rinsed with 1 gallon of water to remove residual detergent, grease, & grime.
- Hydrovac equipment and absorbent socks were used to control the rinse water.
- Absorbent pads were used to dry the floor surface once the bulk of the rinse water was collected.

Solvent Wash

- Second wash with solvent.
- 761.30(p) requires kerosene, terpenes, and other solvents in which PCBs are ≥ 5% soluble.
- Approximately 0.1 gallon of ZEP Big Orange (a terpene hydrocarbon solvent) was applied to each SF of floor.
- Each square foot was then washed for 1 minute by scrubbing and wiping.
- Excess solvent wiped up with absorbent pads and contained.

Solvent Rinse

- Solvent rinse followed wash.
- Approximately 0.1 gallon of terpene solvent was applied to each square foot of floor.
- Each square foot of floor was made very wet with solvent for at least 1 minute.
- Excess solvent was wiped up with absorbent pads, and then contained for disposal.

Acid Wash (not a regulatory requirement)

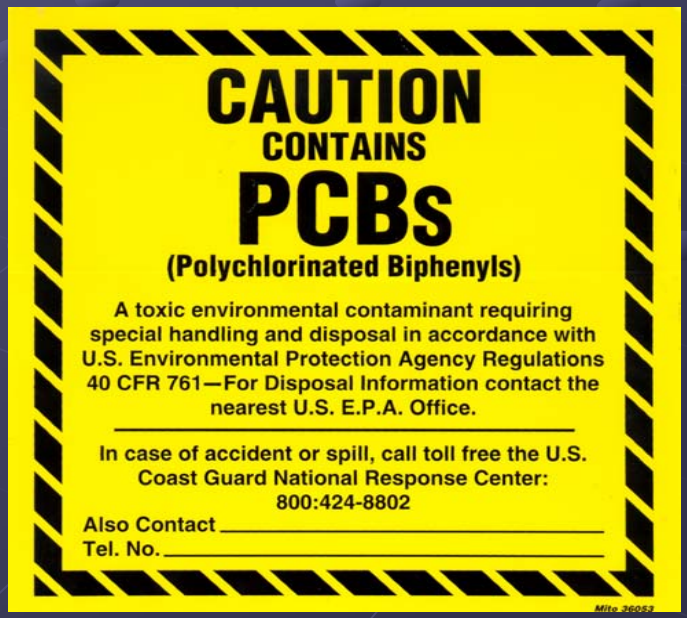
- Industrial coatings specialist inspected concrete surface and recommended that the floor profile be increased to ensure epoxy adherence.
- Floor washed with a 30% hydrochloric acid solution.
- Followed with water rinse to neutralize residual acid.
- This step is not specified in 761.30(p) use authorization or Subpart S.

Epoxy Application

- 761.30(p)(1)(iii)(A) requires application of either epoxy encapsulant or solid barrier.
- Floor was allowed to dry for 24 hours after the final rinse.
- Two coats (red & gray) of Sherwin Williams ArmorSeal 700 HS water based epoxy were applied.
- Required 1 gallon of epoxy per 113 SF per coat on average.
- Ongoing maintenance requirement for epoxy coating.

Marking

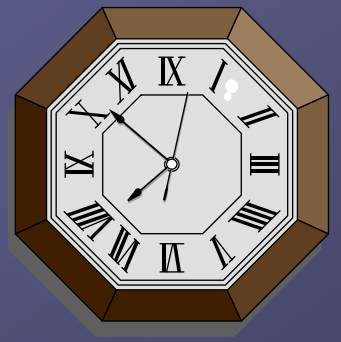
- 761.30(p)(1)(iii)(B) requires that the PCB M_L label be applied to the epoxy-coated surface.
- PCB labels applied at multiple points including area entrances, centers, and places with low likelihood of destruction.
- Ongoing maintenance needed in that 761.30(p)(1)(iii)(C) requires replacement of worn PCB labels.



Results

- Remediation wastes
  - 7,300 gal. rinsate water
  - 300 gal. spent solvent
  - 30 drums of expendables
- Very clean-looking floor.
- Decreased PCB levels.
- Very hard epoxy coating.
- Initially some epoxy cracks, bubbles, and pinholes.
- PCBs encapsulated beneath two layers of epoxy coatings.
- Worker exposure minimized.
- Floor protected from new spills.

Schedule



- Eleven month schedule for 7,000 SF floor area
  - Initial investigation/reporting 2 months
  - Contractor specifications 2 months
  - Contractor selection/mobilization 1 month
  - 761.30(p) work performance 4 months
  - Final reporting 2 months
  - TOTAL 11months
- Contractor spent 67 working days performing 761.30(p) = 104 SF of floor per day on average.
- More than half the time spent on encapsulation.

Cost $$$

- For 7,000 square feet of concrete floor (T&M basis):
  - Initial PCB Investigation $14,800
  - Remedial planning/specs $8,200
  - Contractor labor $130,940
  - Equipment and materials $35,330
  - Waste transportation/disposal $47,940
  - Periodic oversight/sampling $16,000
  - TOTAL PROJECT **$253,210**
- $36.20/SF w/engineering; $30.60/SF without.
- Relatively expensive as it compares with anticipated costs for shallow concrete removal and replacement.
- Have seen a low bid of $11/SF.

Alternative Approach Units Costs

- Sherwin Williams estimated current material and labor cost of $4-5/sq.ft. for application of 2 coats of epoxy.
- Shot blasting is estimated to cost $0.60 to $0.75/sq. ft.
- Removal of ½ inch of concrete by scabbling or scarifying is approximately $10-17 per square foot.
- Resurface floor after ¼ to ½ inch removal is around $8-12 per square foot.
- Remove and replace concrete slab is estimated at $11-15 per square foot.
- These values do not include transportation and disposal of wastes.

Lessons Learned

- Good alternative to allow continued use of concrete.
- Relatively large cost/time requirement (use lump sum).
- Subpart S procedure does not remove all PCBs on the concrete surface.
- Sample for disposal characterization before epoxy.
- Additional preparation beyond Subpart S may be needed to ensure proper epoxy adherence.
- Epoxy application is not as easy as it sounds. Manufacturer's mixing instructions must be followed.
- Mother nature can interfere. Temperature/humidity can affect the quality of the epoxy application.
- Anti-slip materials can be integrated into the epoxy.

Current Conditions
(3 ½ Years Later)

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Limitations

- 761.30(p) may not be cost effective for some areas.
- Long-term maintenance of epoxy and labels is required.
- May not be applicable where use will change.
- Remaining PCBs are still regulated for disposal.
- Not applicable to soil under a concrete slab.

Conclusions

- 40 CFR 761.30(p) use provides a temporary alternative to removal.
- Pros: Minimizes worker exposure, allows continued use of concrete.
- Cons: Cost and time to implement, on-going maintenance, future liability, no distribution in commerce.
- Probably consider only for surfaces that cannot be remediated.

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Richard A. Scadden, P.E.
Intera, Inc.
9111A Research Blvd.
Austin, TX 78758
512-425-2007